nature portfolio

Corresponding author(s): Andrei Kleschyov

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Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed	
☐	☒	The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒	A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒	The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☐	☒	A description of all covariates tested
☒	☐	A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒	A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒	For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐	For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐	For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐	Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	All data in this study were collected by using commercial available software, including: - X-band bench top electron paramagnetic resonance spectrometer MS5000 (Magnettech-Bruker, Freiberg, Germany) - Multi wire myograph system (Model 620M; Danish Myo Technology, Denmark) - High resolution respirometry (Oroboros, O2K, Austria) - ChemiDoc™ MP and software Image Lab 6.0.1 (Bio-Rad, Laboratories, CA, USA). -PowerLab and LabChart 7.0 software (ADInstruments, Castle Hill, NSW, Australia)
Data analysis	Data were analyzed using Graphpad Prism Software (version 9.5.0, (525)).

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

Source data is not applicable (not included), but this can be made available upon request.

Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.

Reporting on sex and gender	N/A (no human studies were conducted)
Population characteristics	N/A (no human studies were conducted)
Recruitment	N/A (no human studies were conducted)
Ethics oversight	N/A (no human studies were conducted)

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	No specific sample size determination was used, but the number of samples, replicates or rounds of experiments were based on previous experience using similar type of experimental in vitro and ex vivo approaches.
Data exclusions	In this study isolated and cleaned aortic rings were used for assessment of vasorelaxation responses. A vessel was excluded from further use and analysis if it did not present normal viability (contractility) after standardization and equilibration protocol.
Replication	For the ex vivo and in vitro studies used in this study all the experimental series (protocols) were repeated at least two times at different time-points/occasions.
Randomization	Randomization was applied in such way that the order of the tested drugs/compounds were added in different order(s).
Blinding	Whenever possible, all the experimental studies or the analysis of the data of this study, were conducted in a blind manner (e.g. the person responsible for the experimental approach did not know what compounds that were tested or the person analyzing the data did not know which groups that were compared).

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☐	☒ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☐	☒ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Antibodies

Antibodies used	Phospho-VASP (Ser239) (#3114, Cell Signaling Technologies) https://www.cellsignal.com/products/primary-antibodies/phospho-vasp-ser239-antibody/3114
Validation	Commercially available primary antibody from Cell Signaling that has been validated and used in numerous studies (more than 80 publications). For details, please see https://www.cellsignal.com/products/primary-antibodies/phospho-vasp-ser239-antibody/3114

Animals and other research organisms

Policy information about studies involving animals; ARRIVE guidelines recommended for reporting animal research, and Sex and Gender in Research

Laboratory animals	Male Wistar rats (200–250 g) and male C57BL/6 mice (20-25 g) purchased from Janvier Labs (France).
Wild animals	N/A
Reporting on sex	Only males were used in this study, but the results and the overall conclusions most likely apply to both sexes.
Field-collected samples	Animals used in this study were housed at the animal facility (KM-B) at the Karolinska Institutet, using ordinary cages in temperature and humidity-controlled room with 12/12 h light/dark cycle and feed with standard rodent chow and water ad libitum.
Ethics oversight	All experimental protocols were approved by the regional Institutional Animal Care and Use Committee in Stockholm (Dnr 17128-2021 and N139/15) and performed according to the US National Institutes of Health guidelines (NIH publication NO. 85-23, revised 1996) and EU directive 2010/63/EU for the conduct of experiments in animals.

Note that full information on the approval of the study protocol must also be provided in the manuscript.